DISCUSSION AND CORRESPONDENCE.

ISOLATION AND EVOLUTION.

It seems to the writer to be a cause for congratulation that a variety of possible factors of evolution are being discussed at the present time. Just as the factors associated with Darwin's name together with those of the Lamarckian school overshadowed all others in the discussions of the last forty-five years, so now we are in danger of having the 'mutation theory' of de Vries obscure the botanical eye to all other factors. Not that I would endeavor to throw any doubt upon de Vries's facts; they are well authenticated. But they do not, like the socialist's theory of political economy, exclude every other factor from the problem, and we should not, consciously or unconsciously, so consider them.

I have been greatly interested in President Jordan's article on the part played by isolation in evolution. While not disputing the efficacy of isolation as a factor, I would long hesitate to assign it the leading rôle to which President Jordan assigns it. Professor Lloyd's statement of the floral evidence against Jordan's dictum is well put and timely, and emphasizes a fact of distribution which is well known to botanists. If it were necessary to do so, the facts furnished by the distribution of the existing flora could be supplemented by paleobotanical evidence in so far as facts of this nature are available. For instance, during the mid-Cretaceous we have a remarkable series of synchronous or nearly synchronous[1] leaf-bearing strata outcropping from the west coast of Greenland on the north, through Marthas Vineyard, Long Island, Staten Island, New Jersey, Delaware, Maryland and Alabama. These plant-beds have yielded an abundant flora and each locality furnishes a number of closely related species which are largely identical throughout the series. The following genera might be mentioned: *Magnolia, Liriodendron, Laurus, Sassafras, Cinnamomum, Ficus, Aralia,* etc.

[1] The fact of correlation of the containing strata is of no importance for the argument when each outcrop furnishes several species which evidently lived in the same habitat.

Taking the genus *Magnolia* we have the following distribution of species in this region: Greenland, four; Marthas Vineyard and Alabama, five; Long Island, eight; Maryland, three; Raritan formation (N. J.), eight; Magothy formation (N. J.), three. In the genus *Ficus* Greenland furnishes three species and there are four species in each of the other localities, with the exception of Marthas Vineyard. While in many cases leaf species may be regarded as variations of a single actual species, in numerous other instances we can be sure that such was not the case.

It would seem that isolation has not been a primary factor to any large extent in specific differentiation, but that it has operated in a larger way in the development of generic or even larger groups in isolated, particularly in insular, regions. In other words, that it gives a facies to the flora of any region. This is implied in Professor Lloyd's article and is merely the statement of a well-known fact of observation. For instance, the Australian region has a peculiar flora comparable to its marsupial fauna, and it is difficult to imagine that the facts are not explained in one case as in the other by isolation. If we examine this flora we find a number of characteristic types of plant-life, the acacias, eucalypts, the many Rhamnaceæ, Proteaceæ, Santalaceæ, Leguminosæ, etc., the latest with over one thousand species. In all these groups we find numerous species, in many cases an excessive number, closely related, and many with largely identical habitats, so that Professor Lloyd's contention regarding distribution and specific differentiation receives a large measure of support.

Edward W. Berry.
Maryland Geological Survey,
Baltimore, Md.

ON THE HUMAN ORIGIN OF THE SMALL MOUNDS OF THE LOWER MISSISSIPPI VALLEY AND TEXAS.

The following extracts bearing on the theory of the human origin of the small mounds of the lower Mississippi Valley and Texas, resuggested in a recent issue of Science by Mr. D. I. Bushnell, Jr.,[1] may be of interest at this time:

[1] Vol. 22, pp. 712–714.

Foster in his 'Prehistoric Races of the United States' gives the following data:[2]

"There is a class of mounds," remarks Professor Forshey in his manuscript notes, "west of the Mississippi Delta and extending from the Gulf to the Arkansas and above, and westward, to the Colorado in Texas, that are to me, after thirty years familiarity with them, entirely inexplicable. In my Geological Reconnaissance of Louisiana, in 1841–2, I made a pretty thorough report on them. I afterwards gave a verbal description of their extent and character before the New Orleans Academy of Sciences. These mounds lack every evidence of artificial construction, based in implements or other human vestigia. They are nearly round, none angular, and have an elevation hemispheroidal, of one to five feet, and a diameter from thirty feet to one hundred and forty feet. They are numbered by the millions. In many places, in the pine forests and upon the prairies, they are to be seen nearly tangent to each other, as far as the eye can reach, thousands being visible from an elevation of a few feet. On the Gulf margin, from the Vermillion to the Colorado, they appear barely visible, often flowing into one another, and only elevated a few inches above the common level. A few miles interior they rise to two or even four feet in height. The largest I ever saw were perhaps one hundred and forty feet in diameter and five feet high. These were in western Louisiana. There is ample testimony that the pine trees of the present forest antedate these mounds. The material of their construction is like that of the vicinity everywhere, and often there is a depression in close proximity to the elevation."

Professor Forshey then proceeds to state that he encountered hundreds of these mounds between Galveston and Houston, and between Red River and the Ouichita; and they were so numerous as to forbid the supposition of their having been the foundations of human habitations; that the borrowing animals common to the region piled up no such heaps; and finally that the winds, while capable of accumulating loose materials, never distribute them in the manner above mentioned. In conclusion, he adds, "In utter desperation I cease to trouble myself about their origin, and call them 'inexplicable mounds.'"

Colonel S. H. Lockett, in his report on the topographical survey of Louisiana,[3] speaks of them as follows:

There is one feature observed in these prairies, as well as in much of the bottom lands of Ouachita and Moorehouse parishes, quite peculiar and striking, namely, a very great number of small isolated mounds. * * * They are thought by the inhabitants to be Indian mounds, and some of them have been excavated and Indian relics found; but it is hardly probable that so many tumuli, so irregularly scattered over so large a scope of country, can all be the results of human labor, but rather of natural origin and then subsequently used in some cases as burying grounds for the aborigines.

De Nadaillac, in his 'Prehistoric America,' says:[4]

Between Red River and the Wichita[5] they ('the Indian garden-beds') can be counted by thousands. According to Forshey, who described them to the New Orleans Academy of Sciences, these embankments can not have served as the foundations for homes of men. Other archeologists are more positive; they consider that these embankments were used for nothing but cultivation, and that they are intended to counteract the humidity of the soil, still the greatest obstacle with which the tillers of the soil of the plains of the Mississippi Valley have to contend.

The writer has assisted in the excavation of a number of Indian village sites and mounds in Indiana and Kentucky, and has observed and described Indian mounds and village sites occurring in various parts of Louisiana,[6] and feels that the theory of human origin is in no way applicable to the great class of natural mounds which he has observed in Louisiana, Texas and Arkansas and along the Iron Mountain Railroad in southeastern Missouri. The idea of human origin suggests itself at once to every observer, and it strongly attracted the writer when he first examined these natural mounds in Louisiana in 1898, but more extended study showed such a hypothesis to be entirely inadequate.

[2] Foster, J. W., 'Prehistoric Races of the United States,' 2d ed., Chicago, 1873, pp. 121–122.

[3] First Ann. Rept. Topog. Surv. La. for 1869, 1870, pp. 66–67.

[4] 'Prehistoric America,' by Marquis de Nadaillac, translated by N. d'Anvers, 1895, p. 182.

[5] Now spelled Ouachita.

[6] 'Catalogue of Aboriginal Works of Caddo Bottoms, Louisiana,' La. Geol. Survey, Rept. for 1899 [1900], pp. 201–203. [Aboriginal Remains on Belle Isle, Grande Côte, Petite Anse, Louisiana], La. Geol. Survey, Rept. for 1899, pp. 209, 237, 251–253. 'Notes on Indian Mounds and Village Sites Between Monroe and Harrisonburg, Louisiana,' La. Geol. Survey, Rept. of 1902, pp. 171–172.

Opposed to this theory are the following facts: (1) The natural mounds in many cases do not occur in situations favorable for camp sites. (2) They often occur in elevated locations, where there is absolutely no reason for artificial 'elevated sites for habitations.' (3) Regarded as ruined habitations, or wigwam sites, it is very important to consider their vast number and the extent of territory covered. On this basis they would indicate, in many parts of Louisiana and Texas, an intensity and multiplicity of life not now duplicated in any rural community in the world. The sustenance of such vast communities would be entirely beyond the capabilities of the people who built the true Indian mounds. (4) The natural mounds generally occur on the poorest land in the northern Louisiana region, and this fact is strongly opposed to any supposed agricultural significance.

No one doubts that there are numerous Indian mounds throughout this region, but the natural mounds belong to an entirely different class and should not be confused in this discussion with the artificial ones.

A. C. Veatch.

U. S. Geological Survey,
Washington, D. C.,
December 2, 1905.

Special Articles.

The Terminology of Aberrant Chromosomes and their Behavior in certain Hemiptera.[1]

Comparative studies of the last few years have brought to light the occurrence of different kinds of chromosomes within the same cell, curiously modified or aberrant structures. These have been described in the spermatogenesis of various insects, as in the Orthoptera (by McClung, Wilcox, de Sinéty, Sutton, Baumgartner, Montgomery, Stevens), the Hemiptera (by Henking, Montgomery, Paulmier, Gross, Wilson), Odonota (McGill), and Coleoptera (Voinov, Stevens); in Chilopoda (by Blackman and Medes); and in Araneæ (by Wallace and Montgomery). I have shown that they are not present in the Protracheata (*Peripatus*). For these a considerable variety of names has been proposed, most of which are good appellatives, but all are inconvenient on account of their length or double form. There is a pressing need for a conciser and more uniform nomenclature, and the following terminology is here proposed to cover the three known kinds of chromosomes found to occur in the groups above mentioned.

Chromosome, a name introduced by Waldeyer, to be retained on account of its long usage as a convenient collective term, and also to be applied in those cases where all the chromosomes of a cell show essentially the same behavior. But when more than one kind occurs in a cell, they are to be distinguished as follows:

1. *Autosoma* (or *autosome*), the usual or non-aberrant chromosomes, called by me previously *ordinary chromosomes*.

2. *Allosoma* (or *allosome*), the modified chromosomes that behave differently from the preceding. This term is much more convenient than the appellative *heterochromosome* previously proposed and used by me, for the latter has an excessive length. Two kinds of allosomes are known in spermatogenesis and may be named respectively:

(*a*) *Monosoma* (or *monosome*), allosomes that are unpaired in the spermatogonia. These have been variously termed *accessory chromosomes* (McClung), *chromosomes spéciaux* (de Sinéty), *chromosomes x* and *unpaired ordinary chromosomes* (Montgomery), and *heterotropic chromosomes* (Wilson).

(*b*) *Diplosoma* (or *diplosome*), allosomes that are paired in the spermatogonia. These correspond to what have been previously denominated *chromatin nucleoli* (Montgomery), *Chromosome nucleoli* (in parte), *small chromosomes* (Paulmier), and *idiochromosomes* (Wilson).

It is after considerable hesitation that I decided to propose these new names, for cellular nomenclature is already heavily overburdened, and I do so in the hope that they may be accepted in the spirit in which they are offered, namely, to attain greater brevity and convenience in writing. When one has to use words frequently he desires them as short as possible. And though I call upon fellow workers to discard their previous names,

[1] Publications from the Zoological Laboratory of the University of Texas, No. 71.